



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,486	03/12/2004	Timothy Graham Bradley	BLD920040003US1	8390
36491	7590	09/11/2007		
Kunzler & McKenzie 8 EAST BROADWAY SUITE 600 SALT LAKE CITY, UT 84111			EXAMINER UHLENHAKE, JASON S	
			ART UNIT 2853	PAPER NUMBER
			MAIL DATE 09/11/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/799,486

Applicant(s)

BRADLEY, TIMOTHY GRAHAM

Examiner

Jason Uhlenhake

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 June 2007.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 5-11, 13, 17, 20-25, 27, 29, 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al (U.S. Pat. 5,77,644) in view of Darty (U.S. Pat. 6,312,110)

Yoshimura et al discloses:

- ***regarding claim 1***, a pressurized ink chamber (Figure 2) configured to contain an electrorheological ink, the pressurized ink chamber in fluid communication with a nozzle (2)
 - a stimulator pressure generation device (4) configured to generate a synchronization signal to increase the pressure in the pressurized ink chamber (Figure 2); and an electrode (6) arrangement configured to create an electric field to control a flow of the electrorheological ink at the nozzle (Figures 2-7; Abstract; Column 3, Lines 6-64)
- ***regarding claim 5***, the electrode (6) arrangement comprises one or more electrodes circumscribing a portion of the nozzle (Figures 2-5)

- **regarding claims 6, 21**, the electrode arrangement is configured to create an electric field to stop (impede) the flow of the electroheological ink in the nozzle (Column 4, Lines 27-38)
- **regarding claims 7, 22**, the electrode arrangement is configured to create an electric field to slow (impede) the flow of the electrorheological ink in the nozzle (Column 4, Lines 27-38)
- **regarding claim 8**, a plurality of nozzles forming a nozzle array and the electrode arrangement is one of a plurality of electrode arrangements, each electrode arrangement disposed to control a flow of the electrorheological ink at one of the plurality of nozzles (Figure 2-8; Column 4, Line 55 – Column 5, Line 34)
- **regarding claim 9**, the flow of the electrorheological ink at each nozzle of the nozzle array is independently controlled (Figure 8; Column 5, Lines 16-34)
- **regarding claim 10**, a print control module configured to receive a print signal (Figure 12); a synchronization signal module (4) configured to control the synchronization signal generated by the stimulator; an electrode (6) control module configured to synchronize a voltage level at the electrode arrangement with the synchronization signal and the print signal (control unit; Column 6, Lines 29-50)
- **regarding claims 11, 24**, control module configured to de-energized the electrode arrangement about when the synchronization signal and the print signal are enabled (Column 4, Lines 23-54)

- **regarding claim 13**, a viscosity control module (32) configured to control the viscosity of the electrorheological ink as the electrorheological ink discharges from the nozzle (Figure 12; Column 6, Lines 29-50)
- **regarding claim 17**, computer readable storage medium comprising computer readable code configured to carry out a method for electrorheological printing, comprising; pressurizing an electrorheological ink in an ink chamber, the ink chamber in fluid communication with a nozzle; generating a synchronization signal, the synchronization signal increasing the pressure in the pressurized ink chamber; and creating an electric field to control a flow of the electrorheological ink at the nozzle (Figures 2-7, 12; Abstract; Column 3, Lines 6-64; Column 6, Lines 29-50)
- **regarding claim 20**, wherein controlling the flow of the electrorheological ink at the nozzle comprises changing the viscosity of the electrorheological ink (Abstract; Column 4, Lines 22-38)
- **regarding claim 23**, discharging a drop of the electrorheological ink from the nozzle (2) (Figure 2)
- **regarding claim 25**, method further comprises receiving a print signal (Figure 12; Column 6, Lines 29-50)
- **regarding claim 27**, controlling the viscosity of the electrorheological ink as the electrorheological ink discharges from the nozzle (Column 3, Lines 21-32; Column 4, Lines 22-38)
- **regarding claim 29**, a method for electrorheological printing, comprising; pressurizing an electrorheological ink in an ink chamber, generating

Art Unit: 2853

a synchronization signal, the synchronization signal increasing the pressure in the pressurized ink chamber; and creating an electric field to control a flow of the electrorheological ink at the nozzle (Figures 2-7, 12; Abstract; Column 3, Lines 6-64; Column 6, Lines 29-50)

- ***regarding claim 30***, electrorheological printing, comprising; means for pressurizing an electrorheological ink in an ink chamber; means for generating a synchronization signal, the synchronization signal increasing the pressure in the pressurized ink chamber; and means for creating an electric field to control a flow of the electrorheological ink at the nozzle (Figures 2-7, 12; Abstract; Column 3, Lines 6-64; Column 6, Lines 29-50)

Yamaguchi does not disclose expressly the following:

- ***regarding claims 1, 8, 17, 20-22, 29, 30***, an electrode arrangement configured to create an electric field to control a rate of discharge of the electrorheological ink through the nozzle

Darty discloses:

- ***regarding claims 1, 8, 17, 20-22, 29, 30***, an electrode arrangement configured to create an electric field to control a rate of discharge of the electrorheological ink through the nozzle (Abstract; Column 7, Lines 9-17), for the purpose of utilizing a high resolution print head

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Darty into the device of Yamaguchi, for the purpose of utilizing a high-resolution print head

Art Unit: 2853

Claims 2, 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al (U.S. Pat. 5,77,644) in view of Darty (U.S. Pat. 6,312,110)

Yamaguchi discloses:

- ***regarding claim 15***, a nozzle configured to discharge a drop of ink; an ink having an electrorheological composition, the ink configured to change viscosity in response to an electric field (Figures 2-7; Abstract; Column 3, Lines 6-64)

Yamaguchi does not disclose expressly the following:

- ***regarding claim 2***, the electrode arrangement comprises a ring electrode pair having a first ring electrode and a second ring electrode
- ***regarding claim 15***, an arrangement of ring electrodes configured to create the electric field to control the rate of discharge of the drop of ink from the nozzle

Darty discloses:

- ***regarding claim 2***, the electrode arrangement comprises a ring electrode pair having a first ring electrode and a second ring electrode (Figure 4; Column 1, Lines 35-41; Column 4, Lines 40-64), for the purpose of utilizing a high resolution print head
- ***regarding claim 15***, an arrangement of ring electrodes configured to create the electric field to control the rate of discharge of the drop of ink from the nozzle (Figure 4; Column 1, Lines 35-41; Column 4, Lines 40-64; Column 7, Lines 9-17), for the purpose of utilizing a high resolution print head

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of the electrode arrangement comprises a ring electrode pair having a first ring electrode and a second ring electrode as taught by Darty into the device of Yamaguchi, for the purpose of utilizing a high resolution print head

Claims 3-4, 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al (U.S. Pat. 5,77,644) as modified by Darty (U.S. Pat. 6,312,110) as applied to claim 1 above, and further in view of Takahashi (U.S. Pat. 6,695,439)

Yamaguchi discloses:

- ***regarding claim 16***, a nozzle array defining a plurality of nozzles, each nozzle defining a nozzle volume configured to contain an ink particle

(Abstract)

- ***regarding claim 3***, the first ring electrode is connected to a first electrical lead and the second ring electrode is connected to a second electrical lead (Darty: Figure 4; Column 1, Lines 35-41; Column 4, Lines 40-64)

- ***regarding claim 16***, a plurality of ring electrodes forming a plurality of ring electrode pairs, each of the plurality of ring electrodes circumscribing one of the plurality of nozzles and each ring electrode pair corresponding to one of the plurality of nozzles; wherein the electric field controls a rate of discharge of the electrorheological ink particle through each nozzle volume (Darty: Figure 4;

Art Unit: 2853

Column 1, Lines 35-41; Column 4, Lines 40-64; Column 4; Lines 1-5; Column 7, Lines 9-17)

Yamaguchi as modified by Darty discloses all the claimed limitations above except for the following:

- ***regarding claim 4***, the first electrical lead is connected to a reference voltage and the second electrical lead is connected to a power supply, the power supply configured to supply a voltage that is different from the reference voltage

- ***regarding claim 16***, a power supply connected via at least one electrical lead to one of each of the plurality of ring electrodes in each ring electrode pair, the power supply configured to supply power to the connected ring electrodes, thereby creating an electric field in each nozzle volume at each electrode ring pair

Takahashi discloses:

- ***regarding claim 4***, the first electrical lead is connected to a reference voltage (ground) and the second electrical lead is connected to a power supply, the power supply configured to supply a voltage that is different from the reference voltage (Figures 31-34; Column 23, Lines 7-15; Lines 41-56), for the purpose of obtaining a desired a large amount of deformation even with a small number of electrodes

- ***regarding claim 16***, a power supply connected via at least one electrical lead to one of each of the plurality of electrodes in each electrode pair, the power supply configured to supply power to the connected electrodes,

Art Unit: 2853

thereby creating an electric field in each nozzle volume at each electrode ring pair (Figures 31-34; Column 23, Lines 7-15; Lines 41-56), for the purpose of obtaining a desired a large amount of deformation even with a small number of electrodes

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of Takahashi into the device of Yamaguchi as modified by Darty, for the purpose of obtaining a desired a large amount of deformation even with a small number of electrodes

Claims 12, 26 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al (U.S. Pat. 5,77,644) as modified by Darty (U.S. Pat. 6,312,110) as applied to claims 1 and 17 above, and further in view of Shima et al (U.S. Pat. 5,801,730).

Yamaguchi as modified by Darty discloses all of the claimed limitations except for the following:

- ***regarding claim 12, claim 26***, a pump control module configured to control a pump to control the pressure in the pressurized ink chamber

Shima et al discloses:

- ***regarding claim 12, claim 26***, a pump control module configured to control a pump to control the pressure in the pressurized ink chamber (Column 3, Lines 8 – 18), for the purpose of circulating ink in the apparatus.

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of a pump control

Art Unit: 2853

module configured to control a pump to control the pressure in the pressurized ink chamber as taught by Shima et al into the device Yamaguchi as modified by Darty, for the purpose of circulating ink in the apparatus.

Claims 14, 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al (U.S. Pat. 5,77,644) as modified by Darty (U.S. Pat. 6,312,110) as applied to claims 1 and 17 above, and further in view of Mutou (U.S. Pat. 5,227,814)

Yamaguchi as modified by Darty discloses all of the claimed limitations except for the following:

- ***regarding claim 14, claim 28,*** a media compensation module configured to modify the voltage level at the electrode arrangement to compensate for the variation in a speed of a print media on which the electrorheological ink is being printed

Mutou discloses:

- ***regarding claim 14, claim 28,*** a media compensation module configured to modify the voltage level at the electrode arrangement to compensate for the variation in a speed of a print media on which the electrorheological ink is being printed (Column 5, Lines 30 – 48), for the purpose of shortening recording time.

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of a media compensation module configured to modify the voltage level at the electrode

Art Unit: 2853

arrangement to compensate for the variation in a speed of a print media on which the electrorheological ink is being printed as taught by Mutou into the device of Yamaguchi as modified by Darty, for the purpose of shortening recording time.

Claims 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamaguchi et al (U.S. Pat. 5,77,644) as modified by Darty (U.S. Pat. 6,312,110) as applied to claim 17 above, and further in view of Minemoto et al (U.S. Pat. 6,224,193)

Yamaguchi as modified by Darty discloses:

- ***regarding claim 19***, the electrode arrangement comprises one or more electrodes (6) circumscribing a portion of the nozzle (2) (Figures 2-5)

Yamaguchi as modified by Darty does not disclose expressly the following:

- ***regarding claim 18***, creating an electric field comprises creating voltage difference between a first electrode and a second electrode

Minemoto et al discloses:

- ***regarding claim 18***, creating an electric field comprises creating voltage difference between a first electrode and a second electrode (Column 4, Lines 19 – 33), for the purpose of ejecting from an ejection electrode with reliability and stability.

At the time the invention was made it would have been obvious to a person of ordinary skill in the art to incorporate the teaching of creating an electric field comprises creating voltage difference between a first electrode and

Art Unit: 2853

a second electrode as taught by Minemoto et al into the device of Yamaguchi as modified by Darty, for the purpose of ejecting from an ejection electrode with reliability and stability.

Response to Arguments

Applicant's arguments with respect to claims 1-30 have been considered but are moot in view of the new ground(s) of rejection.

Darty discloses determining an applied electrode voltage needed to produce the required velocity of ink exiting the nozzles. Even if the ejection velocity of the ink is constant Darty will still need to "control a rate of discharge" of the ink through the nozzle in order to produce the required ejection velocity and keep the ejection velocity constant through the nozzle.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be

Art Unit: 2853

calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

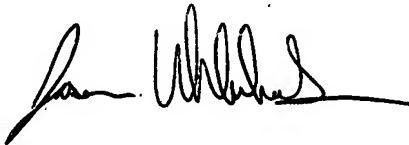
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Uhlenhake whose telephone number is (571) 272-5916. The examiner can normally be reached on Monday - Friday 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on (571) 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JSU

September 2, 2007



STEPHEN MEIER
SUPERVISORY PATENT EXAMINER